NITheP Colloquium

Monday, 28 September 2020, 16h00

Prof Matthias Troyer
Microsoft

A Quantum Future of Computation

Abstract: In less than a decade the field of quantum computing has been transformed from an area with mostly academic activities to own with major investments by most major tech companies. This was triggered both by advances in qubit technology and in quantum algorithms. In this talk I will discuss the challenges involved in identifying and developing applications for quantum computers, and guidelines that help us identify the most promising ones. I will present what I see as the most likely short term and mid term applications of quantum computing. I will end by showing that quantum computing already generates value today, through quantum inspired approaches. These are quantum algorithms implemented on classical HPC hardware that outperform the state of the art of classical methods known before - with applications to health care, logistics, chemistry and other areas.

Bio: Matthias Troyer is a Distinguished Scientist at Microsoft and affiliate faculty at the University of Washington . He is a Fellow of the American Physical Society, Vice President of the Aspen Center for Physics, a recipient of the Rahman Prize for Computational Physics of the American Physical Society for "f*or pioneering numerical work in many seemingly intractable areas of quantum many body physics and for providing efficient sophisticated computer codes to the community*" and recipient of the Hamburg Prize for Theoretical Physics. He has received his PhD in 1994 from ETH Zurich in Switzerland, spent three years as postdoc at the University of Tokyo, and has later been professor of Computational Physics at ETH Zurich until joining Microsoft's quantum computing program at the beginning of 2017. At Microsoft he works on quantum architecture and leads the development of applications for quantum computers. His broader research interests span from high performance computing and quantum computing to the simulations of quantum devices and island ecosystems

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